IN THE CLAIMS

1. (currently amended) A sonar system, comprising:

~~at least~~ one or more sonar emitters;

an array of sonar sensors configured to receive an echo from an outgoing signal generated by said emitter and generate a raw data signal;

~~a~~ at least one of a roll, tilt, and yaw sensor;

input from a sensor capable of determining the latitude and longitude position of the sonar ~~a latitude and longitude sensor such as a GPS~~;

circuitry adapted to collect and reduce said raw data signal to, and output, image data, responsively to said at least one of a roll, tilt, and yaw sensor and to calculate the geographical location of coordinates within said image data based upon the geographical location of the sonar system and the orientation of the sonar system relative to its location and ~~geo-reference the~~ wherein said image data includes coordinate data with respect to a frame of reference fixed with respect to earth;

where said system is capable of generating a complete image with a single transmission.

2. (original) A sonar system as in claim 1, wherein said circuitry is adapted to reduce said raw data signal to image data including two-dimensional image data.

3. (original) A sonar system as in claim 1, wherein said circuitry is adapted to reduce said raw data signal to image data including three-dimensional image data.

4. (currently amended) A sonar system as in claim 1, wherein said transmitter ensonifies a volume with a broad beam and the receiver sensors are configured to receive echoes in such a way that the raw data signals can be processed to produce a beam with a beamwidth ~~resolution beam of~~ smaller ~~beam width~~ than that of the transmitter.

5. (original) A sonar system as in claim 1, wherein said image is combined with ancillary geo-referenced information for display.

6. (original) A sonar system as in claim 1, wherein successive images are combined into one larger geo-referenced image.

7. (original) A sonar system as in claim 6, wherein the said combined image is combined with ancillary geo-referenced information for display.

8. (original) A sonar system as in claim 4, wherein the said receive beam processing utilizes a Discrete Time Fourier Transform (DTFT) at each range sample to combine raw data signals from the receiver sensors.

9. (original) A sonar system as in claim 1, wherein the said circuitry adapted to collect said raw data includes bandpass filters and utilizes band pass sampling techniques to sample said signals.

10. (currently amended) A sonar system as in claim 1, wherein the transmit signal is coded in at least one of phase, frequency, spectrum or time in, such a way that different transmit signals may be distinguished from one another and wherein the transmit and receive systems are capable of supporting said ~~the~~ transmit signal.

11. (original) A sonar system as in claim 1, wherein the volume of processing is confined to a defined spatial volume to reduce computational load.

12 (currently amended) A sonar system as in claim 11, wherein the said volume processing in defined relative to a fixed frame of position and is responsively determined relative to the sonar system from at least one of a roll, tilt, yaw, depth, or latitude/longitude sensor.

13. (currently amended) A sonar system as in claim 1, wherein returns, within a specified spatial location, ~~generated~~ by the beamformer are removed from further processing.

14. (original) A sonar system as in claim 13, wherein returns corresponding to above the sea surface generated by the beamformer are removed from further processing.

15. (original) A sonar system as in claim 13, wherein returns corresponding to a volume immediately near the sonar system generated by the beamformer are removed from further processing.

16. (original) A sonar system as in claim 13, wherein returns corresponding to above the sea surface generated by the beamformer are removed from further processing.

17. (original) A sonar system as in claim 13, wherein returns corresponding to below the sea bottom generated by the beamformer are removed from further processing.

18. (original) A sonar system as in claim 1, wherein returns from within specified spatial volume are removed if they fall below a given signal level.

19. (original) A sonar system as in claim 1, wherein returns from within specified spatial volume are removed if they contain given spectral information.

20. (original) A sonar system as in claim 1, wherein return from behind other returns are removed from display along a given line of sight.

21. (original) A sonar system as in claim 1, wherein returns from the sea floor are smoothed with a line-of-sight filter.

22. (original) A sonar system as in claim 1, wherein targets are grouped together based on at least one of proximity to other targets, signal strength, depth, range, spectral content, and speed.

23. (original) A sonar system as in claim 22, wherein target group information is used classify groups and then process or display group data differently than other groups.

24. (original) A sonar system as in claim 1, wherein any number of alarms may be activated based on at least one of target depth, group size, target range, target bearing, target signal strength, target speed.

25. (original) A sonar system as in claim 24, wherein the said alarm is sounded via at least one of audio, visual, or electronic message with at least one of a user interface, stand alone alarm console, or machine interface.

26. (original) A sonar system as in claim 25, wherein the said alarm information is used by a processor to produce navigation recommendations.

27. (original) A sonar system as in claim 20, wherein said processed image is displayed to the user overlaid upon another image of less processed information.